

CLAIMS

1. A substance-atomizing apparatus comprising:
  - a pump member having:
    - a cylinder opening at one end thereof and closing at the other end thereof;
    - a pipe through which a raw material fluid is introduced from a charge vessel into the cylinder; and
    - a piston reciprocally moved by a drive device in the cylinder to pressurize the raw material fluid in the cylinder; and
    - a generator member inserting the raw material fluid pressurized in the pump member into a hole portion formed therein to atomize a substance included in the raw material fluid according to a nozzle character of the hole portion,
  - wherein a pressure chamber is formed between the piston and a closed end of the cylinder,
  - an intake to which the pipe opens at one end thereof is formed on a cylinder side surface of the pressure chamber,
  - an outlet is formed on the closed end of the cylinder,

the outlet is closed and the raw material fluid is received from the charge vessel into the pressure chamber through the intake in a first stroke of the piston,

the raw material fluid is sent from the pressure chamber into the charge vessel through the intake in the first half of a second stroke of the piston,

the intake is directly closed by a side surface of the piston and the raw material fluid is sent from the pressure chamber into the generator member through the outlet in the last half of the second stroke of the piston.

2. The substance-atomizing apparatus according to claim 1, wherein the pump member has a check valve for opening and closing the outlet.
3. The substance-atomizing apparatus according to claim 1, wherein the generator member has an outlet portion having an outlet hole for sending to a discharge vessel the raw material fluid including the atomized substance therein.
4. The substance-atomizing apparatus according to claim 3, wherein the generator member has;

an outer case connected to the cylinder at one end thereof and to the outlet portion at the other end thereof; and

an inner case accommodated by the outer case and fixed to the outlet portion at one end thereof,

a hollow chamber is formed between the outer case and the inner case,

a communicating hole for communicating the pressure chamber with the hollow chamber through the outlet is formed at one end the outer case,

a center passage which closes at one end thereof and opens to the hollow chamber at the other end thereof is formed in the inner case,

a plurality of the hole portions which each opens to the center passage at one end thereof and to the hollow chamber at the other end thereof are formed on a side surface of the inner case.

5. The substance-atomizing apparatus according to claim 4, wherein the inner case is made of a ceramic.

6. The substance-atomizing apparatus according to claim 4, wherein the inner case is fixed to a concave portion formed on an end face of the outlet portion, at one end thereof.

7. The substance-atomizing apparatus according to claim 4, wherein the inner

case is fixed to a first concave portion formed on an end face of the outlet portion, at one end thereof and to a second concave portion formed on an end face of the cylinder, at the other end thereof.

8. The substance-atomizing apparatus according to claim 4, wherein the outer case is connected to the cylinder by screwing a male thread portion threaded on one end of the outer case into a female thread portion threaded on the cylinder.

9. The substance-atomizing apparatus according to claim 4, wherein the outer case is connected to the cylinder by screwing a male thread portion threaded on the cylinder into a female thread portion threaded on one end of the outer case.

10. The substance-atomizing apparatus according to claim 4, wherein the outer case is connected to the outlet portion by screwing a male thread portion threaded on the outlet portion into a female thread portion threaded on the other end of the outer case.

11. The substance-atomizing apparatus according to claim 4, wherein the outer case is connected to the outlet portion by screwing a male thread portion threaded on the other end of the outer case into a female thread portion threaded on the outlet portion.